

ELECTRICAL SPECIFICATIONS

CODES AND STANDARDS

The electrical installation shall comply with the following codes and standards:

1. Underwriter's Laboratories Inc. - U.L.
2. National Electrical Code of the NFPA - NEC
3. New York, N.Y. Electrical Code.
4. Occupational Safety and Health Act - OSHA

BLUE PRINTS AND CATALOGS

The Contractor shall prepare and submit to the Engineer for approval, detailed shop drawings, cutting cuts and wiring diagrams in accordance with the requirements of the clause entitled "Working Drawings and Cutting Cuts and Drawings."

SUBSTITUTIONS

Any substitution to the electrical items described on this contract will only be permitted upon written approval of the Engineer.

QUALITY ASSURANCE

The Contractor shall have had experience on at least two projects involving quantities and complexities at least equal to those required under the electrical portion of this contract. All workmen shall be skilled in the trade involved.

INSPECTION

All stages of the installation shall be inspected for compliance with the requirements of the contract drawings and specifications. Replace any portion of the construction that does not meet such requirements, to the satisfaction of the Engineer.

CUTTING AND PATCHING

1. All cutting and patching required for equipment included in these specifications shall be done by this Contractor. If cutting is done due to failure to perform preliminary roughing work, this Contractor will be responsible for the cost of the additional patching.
2. In those portions of the building where new floors, or walls, or partitions are required to be constructed, the Contractor shall furnish and locate all required sleeves and inserts before the floors, or walls, or partitions are constructed. Where sleeves and inserts were not installed, or were incorrectly located, the Contractor shall be responsible for the cost of any required cutting and patching.
3. All floor drilling above or adjoining occupied tenant spaces or public areas shall be performed at times approved by the Engineer.
4. This Contractor shall not do any cutting that may impair the strength of the building construction. No holes, except for small screws, may be drilled in beams or other structural members without obtaining prior approval. All work shall be done in a neat manner by mechanics skilled in their trades and as approved.

DISSIMILAR METALS

1. Dissimilar metals as used herein shall be those which are incompatible in the presence of moisture, as determined from their position in the electrochemical series or from test data. Where dissimilar metals come in contact, paint the joint both inside and out with approved paint so as to exclude moisture from the joint, or provide a suitable barrier separating the metals.
2. Transitions in conduit from one metal to a dissimilar metal shall only be made at boxes or other enclosures, except where otherwise specified herein or shown on the contract drawings.

WIRING AND BOXES

1. Where sizes of raceways or boxes are not indicated, the Contractor shall size these items as required for the installation.
2. Flexible metal conduit shall be used for the final connection of lighting fixtures and wiring devices to be installed in hung ceilings or in removable wall or ceiling partitions. When designated by the Engineer on final approved drawings, flexible metal conduit shall be used for final connection of lighting fixtures and wiring devices to be installed in movable walls or movable partitions. Flexible metal conduit shall be used in such designated movable walls and movable partitions at no additional cost to the owner.
3. All conduit and tubing shall be cut square and reamed at the ends. Red lead shall be applied to all exposed threads after joints have been made clean and tight.
4. Conduit and tubing runs shall be mechanically and electrically continuous from service starting to all outlets. Conduit shall enter and be securely connected to cabinet, junction box, pull box or outlet box by means of locknuts on the outside and inside and an insulated bushing on the inside. In tubing or flexible metal conduit, the one compression locknut shall be made wrench tight. All locknuts shall be the locking type with serrated edges for digging into the metal wall of the enclosure and shall be installed in a manner that will ensure a locking and electrically continuous installation. Locknuts and bushings will not be required where conduits are screwed into tapped connections.
5. All vertical runs of conduit or tubing terminating in the top of wall boxes or cabinets, or similar locations, shall be protected from the entrance of foreign material prior to the installation of enclosures.
6. Unless otherwise specified, all conduit and tubing shall be installed concealed in general; all conduit and tubing shall be run in hung ceilings and finished spaces where they exist. Where conduit is run in finished spaces, it shall be secured and supported with zinc coated metal hangers from steel studs or other approved means.

7. Every conduit system shall be installed complete before any conductors are drawn in. Wire pulling lubricants, when utilized, shall be in accordance with the requirements of Underwriters Laboratories Inc. applicable to the specific conductor or cable insulation and raceway material.
8. Where required, and approved by the Engineer, extra deep or extra shallow outlet boxes shall be used to facilitate the installation of the conduit system.

OUTLET DEVICES

1. All device plates for wall outlets (Power and Telephone) shall be brushed satin finish anodized aluminum. Device plates for telephone outlets shall contain a bushed hole.
2. All convenience type receptacles shall be of the grounding type.

GROUNDING

1. Metal raceways, metal enclosures of electrical devices and equipment, lighting standards and other equipment shall be completely grounded in an approved manner.
2. Proper hardware required for complete grounding system, shall be installed by the Contractor.

FASTENERS

Proper fasteners, expansion shield lugs, anchors, bolts with nuts and washers, shims or any other type of fastening devices required to fasten panels or other equipment to foundations, floors, walls or ceiling. Unless otherwise specified herein or shown on the contract drawings, all fasteners shall be hot-dipped galvanized and of sizes and types recommended by the equipment manufacturer and as approved by the Engineer.

WIRES

1. Unless otherwise specified or specifically indicated on the drawings, all conductors for lighting and power shall be tinned single conductor annealed copper with type XHHW insulation, 600 volt and a minimum of 99 percent conductivity.
2. In lieu of a separate green grounding wire and grounding bushings, flexible metallic raceway for connection of lighting fixtures may be utilized as the grounding conductor if a locking type construction snapproof connector especially designed to insure positive grounding is provided.

COLOR CODING

The Contractor shall match the color coding that is being used in the building - any deviation due to limited quantities of cable may be permitted upon written approval of the Engineer.

| 120/208V | System Voltage | 277/480V |
|----------|----------------|----------|
| Black | Phase A | Brown |
| Red | Phase B | Orange |
| Blue | Phase C | Yellow |
| White | Neutral | Gray |
| Green | Ground | Green |

CONNECTIONS

The wiring for lighting, receptacles including outlets for miscellaneous devices and for electric power, including all 120/208V connections into the cellular floor systems shown on the drawings, shall be furnished and installed complete from point of service connection to all outlets indicated on drawings.

CABLE SPLICING

1. No splices or joints will be permitted in either feeders or branches except at outlets or accessible terminals, splices or junction boxes.
2. All materials required for making splices and/or terminations shall be supplied in complete kits - not otherwise specified - the Contractor shall also be responsible to insure that all materials furnished will not adversely affect the physical or electrical properties of any other, or of the wire or cable itself. Kits shall be manufactured by Mac-Prod, Inc., Kearny, N.J. or approved equal.
3. Where the Contractor makes connections to existing wires, he shall cut and disconnect the existing splices from such wires and install new splices to include the existing as indicated.
4. All splices for wire sizes 6 AWG and smaller shall be made with insulated wiring connectors applied to twisted conductors. Two half tapered layers of vinyl tape extending a distance of not less than one inch from the connector shall be applied. Splices other than the above mentioned, will be permitted at the discretion of the Engineer.

LIGHTING FIXTURES HANGING

1. Splices shall not be permitted in any run of fluorescent wiring.
2. Connections to branch circuit conductors and to existing fixture wiring shall be made by insulated spring connectors or other type connectors.

IDENTIFICATION OF WIRES

1. All wires shall be identified by circuits in all cabinets, trays, wiring troughs and other enclosures, and at all terminal points, i.e., receptacles, etc.
2. The circuit designations shall be as shown on the contract drawings, or as shown on the drawings. The circuit designations shall be as shown on the drawings, or as shown on the drawings. The circuit designations shall be as shown on the drawings, or as shown on the drawings.
3. Where 12-220 volt wires are used terminal markers shall be used for all wire identification.

LIGHTING FIXTURES

GENERAL

1. This clause of the Specification covers the furnishing, materials, equipment and the installation of all fixtures, lighting equipment and the installation of electrical outlets in the building, including the fixtures and equipment to the electric wiring plans. As specified hereinafter, fixtures shall be furnished by the Contractor for installation and connection. The Contractor is directed to review the applicable Electrical drawings for details on fixture connections, installation methods for fixtures. The drawings shall show a final design, and reasonable changes to design.
2. All luminaires and lighting equipment shall be furnished by the Contractor, including all mounting components necessary for the proper operation.
3. All fixtures and components shall be made in accordance with the National Electrical Code, all local codes apply and all applicable requirements of the Underwriters Laboratories.

LAMPS

Lamps shall be those manufactured by General Electric, Philips, or Sylvania. All fluorescent lamps shall be warm white, applicable incandescent lamps shall be rated at 100 watts or otherwise noted. The Contractor shall install new lamps in all new and supply fluorescent lamps for base building type lamps shall be furnished by the Contractor. "Supply" shall be purchased from.

Prior to acceptance and final payment, all lamps will be burnt-out or broken shall be furnished or replaced.

Installation and Location of Fixtures

Fixture locations as indicated on the electrical drawings and approximately. The Contractor shall carefully verify with Architectural plans, reflected ceiling plans and other drawings prior to installation.

Wiring

1. Wiring between fluorescent lampholders and other starting equipment shall be of the same or higher than that furnished with the approved types of ballasts. Wiring shall be better insulating and heat-resisting character within fluorescent lighting fixtures or from the building wiring shall conform to the latest published issue of the National Electrical Code. Unless otherwise specified or shown on drawings, connections with incandescent fixtures shall conform to the requirements of the latest issue of the National Electrical Code. Wiring shall be not less than No. 16 Gauge. Wiring shall be or tubing at all points where abrasion is likely to occur, concealed within fixture construction, except for mounting brackets otherwise.
2. Connections of wires to terminals of lampholders shall be made in a neat and workmanlike manner, electrically and mechanically secure with no loose wires. The number of wires extending to or from the terminals or other accessory shall not exceed the number designed to accommodate.
3. Joints in wiring within lighting fixtures and other wiring to the wiring of the building shall be so made mechanically and electrically secure and provide insulation equal to that of the conductors of solder and tape, approved types of adequate pressure crimped type connectors may be furnished, method of application and tools employed shall be the responsibility of the Contractor.
4. Wiring channels and wireways shall be free from sharp edges throughout, and all points or corners shall be rounded or beveled. Insulated bushings shall be used at entrances or exits of flexible wiring.

Fluorescent Lamp Ballasts

1. Ballasts shall provide and assure safe and reliable operation of fluorescent lamps specified for each particular fluorescent lamp(s) specified for each fixture. Ballasts shall be of high power factor type series or maximum efficiency design for operation of Rapid Start.
2. The ballast shall be protected by a minimum of 1/8 inch of steel plate or other material which includes a safety program providing for the payment of equipment in the replacement of inoperative in-wire ballasts.

ACCESSORIES

1. Necessary fixtures shall be furnished complete with all accessories, where necessary to meet code requirements shall be furnished for a 1 hour fire rating. Necessary accessories including brackets, hangers, and the like shall be of formed or cast metal and shall be of sufficient strength to maintain a level position.
2. Fixtures shall be attached to ceiling support in accordance with the manufacturer's instructions.